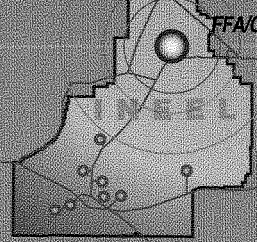


Test Area North

FFA/CO Designation: Waste Area Group 1



Established: 1951

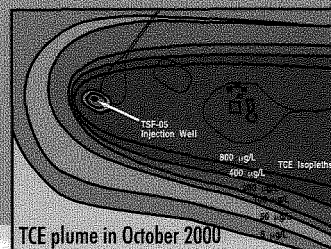
Original Mission: Aircraft Nuclear Propulsion Program

Later Mission: Investigated Three Mile Island-II reactor core material; tested reactors and nuclear fuel; manufacturing

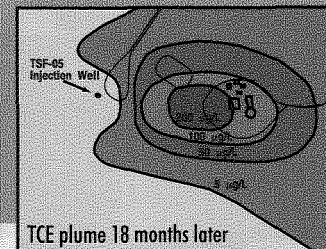
Current Mission: Inspecting and storing spent nuclear fuel; manufacturing armor for military vehicles



Final shipment of Three Mile Island-II spent nuclear fuel



TCE plume in October 2000



TCE plume 18 months later

Three Mile Island-II Fuel Transferred Ahead of Schedule

On April 1, 2001, six weeks before the June 1 deadline, the INEEL transferred the last of 341 canisters holding Three Mile Island-II spent nuclear fuel and core debris from Test Area North to the Idaho Nuclear Technology and Engineering Center. This concluded a complex, six-year effort to meet a milestone established by the Idaho Settlement Agreement.

Workers moved the Three Mile Island-II core debris from an aging storage pool to a new, dry storage facility licensed by the Nuclear Regulatory Commission. Dry storage is a safer configuration for the fuel and will save nearly \$4 million per year in maintenance costs. In addition, the fuel is a step closer to being ready for shipment when a final repository becomes available.

Agencies Agree to New Remedy for Contaminated Groundwater

In September 2001, the DOE, EPA and IDEQ signed a Record of Decision that modifies the original remedy for groundwater

contamination at Test Area North. The groundwater is contaminated from past wastewater disposal activities.

The agencies selected monitored natural attenuation and in situ bioremediation as additional remedies to be combined with the pump-and-treat technology originally selected. The proposed changes are expected to work better and faster than pump-and-treat alone. To make sure of this, they will conduct periodic reviews. The combination of remedies is expected to save \$23 million.

The agencies selected in situ bioremediation after making a decision to find more efficient remediation technologies. Laboratory testing at the INEEL and elsewhere indicated that using

bioremediation on trichloroethene, the primary contaminant of concern, had a potential for success. When it was tested in the field, the results far exceeded expectations — trichloroethene concentrations in the source area dropped below detection limits. The process used at Test Area North is called Bioavailability Enhancement Technology™.

Remediation Progress Monitored with Improved Technologies

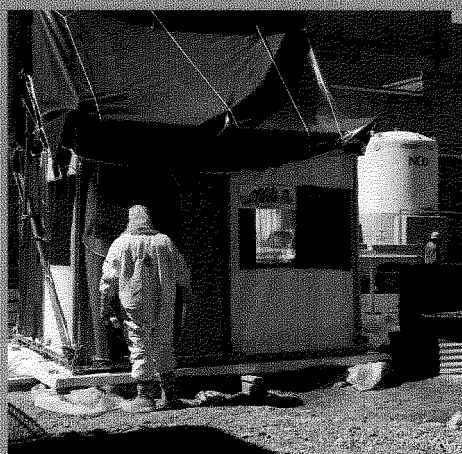
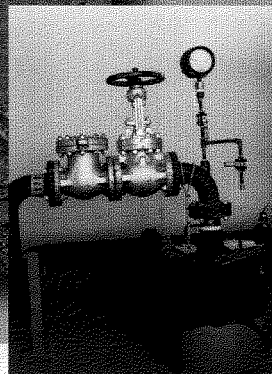
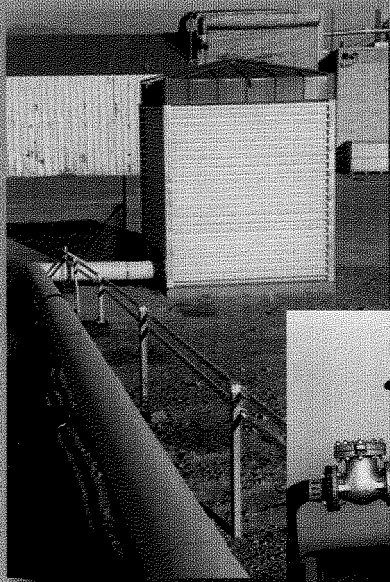
The INEEL is using several new technologies to support groundwater remediation. A real-time monitoring technology, called an autodialer, ensures that operations fall within acceptable parameters so regulatory requirements are met. If there is a problem, the autodialer sends an alarm. This technology will save the INEEL nearly \$100,000 by eliminating weekly visits to the facility.

Scientists are using two new technologies to monitor the progress of the remediation. The technologies reduce costs and concerns about worker safety

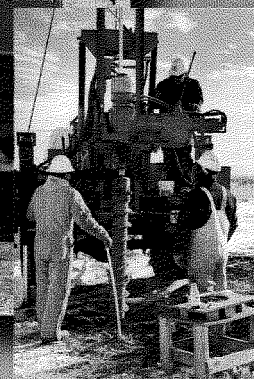
Natural attenuation is the natural decay process of contaminants.

In situ bioremediation takes advantage of natural biological processes that break down trichloroethene when bacteria already present in groundwater are given an appropriate food source. The process also helps dissolve the contaminant, which further accelerates its degradation.

Pump-and-treat pumps the contaminated water to the surface, treats it to remove the contaminants and then reinjects it.



Sampling activities at a v-tank



Sampling activities at a burn pit

A well used for bioremediation

because less time and effort is needed to collect field samples.

A vertical profile sampling technique, developed at the INEEL, monitors the overall effectiveness of natural attenuation. It permits scientists to develop 3-D maps of the contaminated areas to verify that degradation is taking place as predicted.

The FLUTE™ liner system is used in conjunction with the vertical profile sampling technique. It allows scientists to take samples at various depths from a single well.

Numerous Facilities Underwent Deactivation, Decommissioning and Dismantlement

The INEEL eliminated several unnecessary facilities in FY 2001. One of these was the 9,000-square-foot Process Experimental Pilot Plant demonstration facility. The facility was used in 1988 for waste treatment and never processed radioactive material. However, the facility treated circuit boards containing hazardous materials, such as lead, chromium, cadmium, silver, arsenic and selenium.

During the decontamination process, workers removed and disposed of all residual wastes in compliance with applicable regulations.

By decommissioning this and other facilities at Test Area North, INEEL protects the environment and saves money that would otherwise be used to continue monitoring these facilities.

Other Remediation Continues

The INEEL continued remediation efforts at eight contaminated areas identified in the 1999 comprehensive investigation Record of Decision for Test Area North. Workers collected samples from the burn pits and v-tanks and analyzed them to determine the best course of action.

The agencies determined that tank V-9 does not pose a risk of criticality. The tank's contents were scheduled to be shipped to an off-site commercial waste treatment facility, but it has since closed. The INEEL is seeking an alternative for this waste.

FY 2001 Highlights

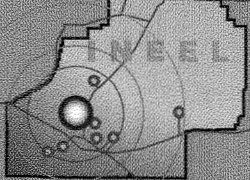
- Completed transfer of Three Mile Island-II spent nuclear fuel to dry storage (Settlement Agreement)
- Issued Record of Decision Amendment for final remediation of groundwater contamination (FFA/CO)
- Began operation of the new pump-and-treat facility (FFA/CO)
- Continued remediation of contaminated sites documented in the 1999 comprehensive Record of Decision (FFA/CO)
- Began sampling v-tanks (FFA/CO)
- Characterized low-level radioactive waste treatment system (VCO)
- Began sampling and characterizing 118 tanks or ancillary equipment (VCO)

FY 2002 Goals

- Continue remediation of contaminated sites and groundwater (FFA/CO)
- Begin D&D of TAN-615
- Begin moving spent nuclear fuel from TAN-607 wet storage to interim dry storage at TAN-791 (Settlement Agreement)
- Begin hazardous waste determinations for TAN-616 system to prepare for 2004 closure (VCO)
- Characterize wastes in 19 tanks and begin closure process (VCO)
- Transfer Loss-of-Fluid Test/commercial/epoxied spent nuclear fuel into interim dry storage

Test Reactor Area

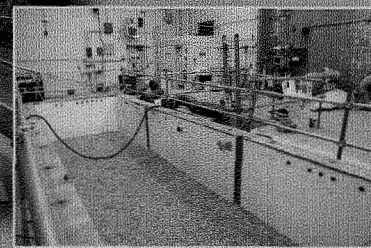
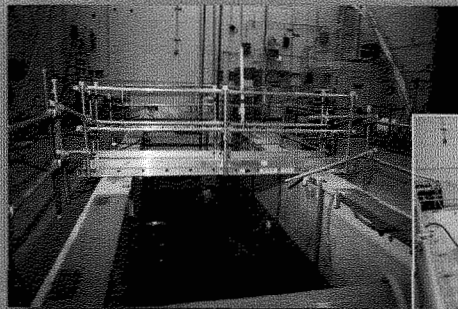
FFA/CO Designation: Waste Area Group 2



Established: 1952

Original Mission: Studied radiation's effect on materials, fuels and equipment using various reactors

Current Mission: Conducting research using the Advanced Test Reactor; producing isotopes for medical and industrial use



The TRA-660 canal is drained and back-filled



Lead is shipped off site for recycling

Deactivation, Decommissioning and Dismantlement Completed; Research Activities Supported

The INEEL completed a complex D&D&D project at TRA-660. The facility housed two low-powered reactors with an interconnecting water canal, sometimes used for spent nuclear fuel storage. Workers drained approximately 30,000 gallons of contaminated water and removed the reactors. During the process, they discovered 18 irradiated capsules and placed them in safe temporary storage to be evaluated.

After the canal was cleared of materials, workers cleaned and filled it with gravel to create a neutron experiment area. The INEEL plans to use the area to test variations of the Portable Isotopic Neutron Spectroscopy system. The innovative, award-winning technology analyzes the contents of sealed containers to detect chemical weapons.

The INEEL completed this D&D&D project early and under budget.

Deadlines Met; Goals Exceeded

The INEEL met a deadline two months early by repackaging 105 cans of spent nuclear fuel material from the Material Test Reactor. The effort resolved a storage issue and allowed work scheduled for FY 2003 to be moved to FY 2002.

In addition, workers nearly doubled the planned number of shipments of spent nuclear fuel from the Advanced Test Reactor to CPP-666 interim storage — 22 shipments versus the 12 shipments planned. The extra shipments permit the Advanced Test Reactor to continue its planned FY 2002 activities without any impact.

Workers completed hazardous waste determinations and disposed of 50 percent of the items identified in the Voluntary Consent Order two months ahead of schedule. They also completed assessments at six potential release sites identified in FY 2000 and began asbestos abatement activities.

The INEEL eliminated the entire lead waste stream, shipping 54,000 pounds of lead off site for recycling. The shipment included the Material Test Reactor shielded storage container and plug beam assemblies.

FY 2001 Highlights

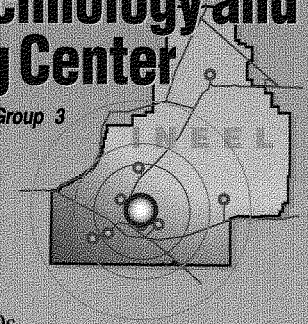
- Completed decontamination of TRA-660 canal (reactivity measurement facilities)
- Completed disposal of legacy low-level waste
- Completed assessment of a potentially contaminated site (FFA/CO)
- Repackaged 105 cans of Material Test Reactor spent nuclear fuel
- Continued groundwater monitoring
- Shipped eight drums of phenolic resin waste off site for treatment and disposal
- Eliminated INEEL's entire lead waste stream, after shipping 54,000 lbs of lead off site for recycling (Site Treatment Plan)
- Began sampling and characterizing 157 tanks or ancillary equipment (VCO)

FY 2002 Goals

- Continue characterizing legacy waste items for eventual disposal
- Continue closure processes (VCO)
- Complete characterization of TRA-660 canal capsules for eventual disposal
- Characterize 22 hazardous waste tanks and begin planning closure (VCO)
- Remove all spent nuclear fuel from the Material Test Reactor canal and send to the Idaho Nuclear Technology and Engineering Center

Idaho Nuclear Technology and Engineering Center

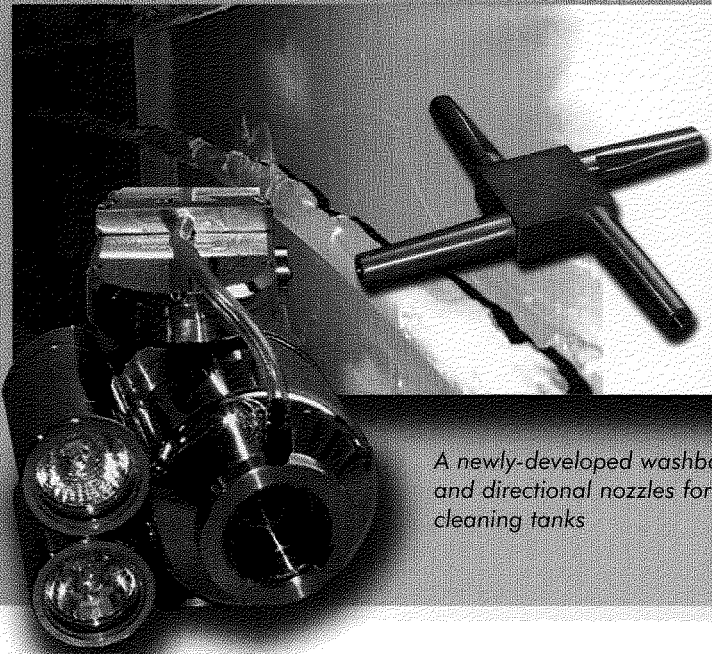
FFA/CO Designation: Waste Area Group 3



Established: Early 1950s

Original Mission: Reprocessed spent nuclear fuel (separating reusable uranium) at Idaho Chemical Processing Plant; calcined high-level waste

Current Mission: Storing spent nuclear fuel, and low-level, mixed low-level and high-level waste; developing treatment methods for high-level waste



A newly-developed washball and directional nozzles for cleaning tanks

Milestones Significantly Exceeded; Waste Inventory Lowest in 40 Years

The INEEL completed two FY 2001 Site Treatment Plan milestones significantly early. Three months before the deadline, workers met a Sept. 30 goal to treat 490,000 gallons of high-level liquid waste. By the deadline, they had processed 605,000 gallons, 25 percent more than required. As a result, for the first time since August 1958, the total volume of liquid sodium-bearing waste in the tank farm is less than one million gallons. Five of 11 high-level waste tanks have been emptied to "heel" level.

Workers overcame many technical challenges to achieve this, including making an upgrade to the C40 valve box to ensure that liquid waste continues to be transferred smoothly from the tank farm to the High-Level Liquid Waste Evaporator.

The second milestone was to treat and prepare 40 spent HEPA filters for disposal. The INEEL accomplished this one month before the deadline, and also treated and prepared an additional eight spent HEPA filters for disposal.

The INEEL also far exceeded its goal for reducing newly generated waste, accomplishing a reduction of 88 percent versus its goal of 50 percent.

Pillar and Panel Vaulted Tanks Emptied and Closure Planned

Five underground radioactive liquid waste storage tanks at the tank farm were emptied to the lowest extent possible in January 2002, nearly 18 months ahead of the June 30, 2003 deadline. The stainless steel tanks are enclosed in pillar and panel concrete vaults, one of three types of concrete vaults enclosing the tank farm's eleven 300,000-gallon underground tanks. Emptying the five tanks was the first step to removing all radioactive liquid waste from the tank farm by 2012 as required by the 1995 Idaho Settlement Agreement.

The next step to final tank closure is to remove the sludge-type residuals or "heels" remaining in the five pillar and panel vaulted tanks. INEEL researchers successfully tested new tank cleaning technologies that will be used to remove the majority of tank residuals. A washball was tested on

a pillar and panel vaulted tank and then enhanced with rotating directional nozzles to clean the tank's bottom and walls. Tank cleaning will begin in 2002 and closure of the first tank is planned for 2003.

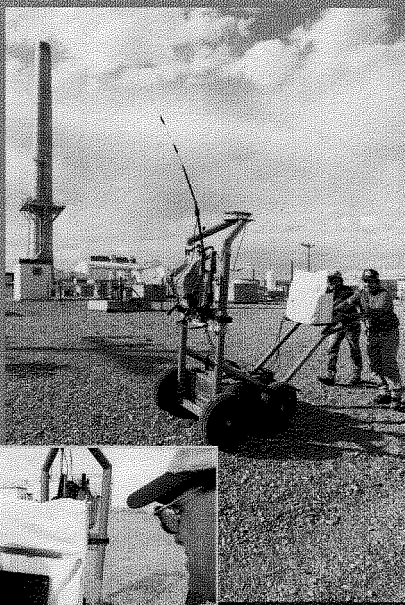
Safe Storage for Spent Nuclear Fuel

The INEEL received spent nuclear fuel from various sources for storage, including a three-cask shipment of foreign research reactor spent nuclear fuel from Germany that was placed in dry storage. In addition, the last of the Three Mile Island-II spent nuclear fuel was transferred from Test Area North and placed in dry storage, completing an Idaho Settlement Agreement milestone. (See Test Area North, page 12.)

Workers also placed 22 Advanced Test Reactor fuel shipments from the Test Reactor Area and 17 Navy fuel shipments in interim storage.

DOE awarded a privatized contract to Foster Wheeler Environmental Corporation to design, build and operate a dry storage facility for spent nuclear fuel. Design is already well under

Surface gamma mapping protects workers at tank farm



Construction activities at INEEL CERCLA Disposal Facility

way as well as a Nuclear Regulatory Commission review of the facility. The facility should be operating by 2005.

New Percolation Ponds Constructed

Workers completed construction of two new percolation ponds. The ponds, which are nearly two miles from the Idaho Nuclear Technology and Engineering Center, will allow a million gallons of clean cooling water to slowly seep into the ground.

The existing percolation ponds are located near contaminated soil. The water seeping from these ponds is keeping the ground partially saturated — possibly forcing the contaminants to move laterally. This issue will be eliminated with the new ponds.

Scientists will also use the new ponds as a vadose zone research park. They will study how water moves from the ground surface to the aquifer to find solutions for issues at Idaho Nuclear Technology and Engineering Center and other facilities, such as the Radioactive Waste Management Complex.

Perched Water Studied

In four years, the agencies must make a decision about groundwater that is “perched” in zones above the aquifer under the Idaho Nuclear Technology and Engineering Center. It is possible that the perched water is carrying contaminants to the aquifer, requiring a need for further action. However, there may be no need if the water dries up.

To better understand the perched water system, scientists are measuring how tightly water is held by soil or rock. They are using an INEEL-developed advanced tensiometer — an *R&D 100* award winner — that allows continuous measurements up to 400 feet below the surface. The measurements provide information that can be used to improve groundwater modeling and reduce uncertainty when selecting remediation alternatives. The new tensiometer improves on conventional tensiometers, which cannot be installed far below the surface and are not very accurate.

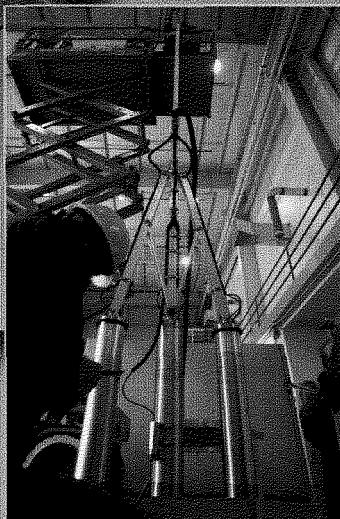
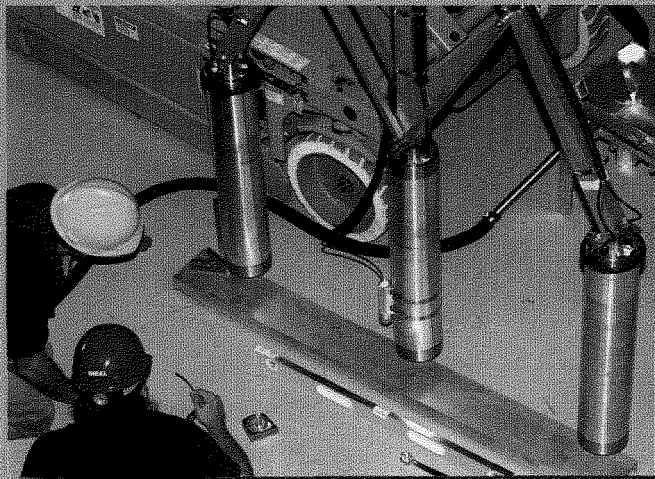
Preventing Contaminant Spread and Worker Exposure

Workers completed actions to reduce the potential spread of contamination from runoff water at the tank farm. In addition to building a run-off retention pond and installing a pump station, they installed 1,200 feet of culverts.

Scientists used the Surface Gamma Mapping system to safeguard workers during construction. The system records surface radiation levels as it is moved across the soil surface and generates a detailed map.

Construction of CERCLA Disposal Facility Begins

The INEEL began construction of a 40-acre CERCLA Disposal Facility for consolidating onsite remediation waste. The facility, which is scheduled to open in 2003, will have a disposal capacity of 510,000 cubic yards. It will include a landfill (primarily for contaminated soils), evaporation ponds (for liquids only) and a facility where contaminated debris can be broken down into smaller parts for disposal.



Scientists use a new inspection technology, which detects spent nuclear fuel elements in CPP-603 basin sludge

In August and November 2001, the INEEL held information workshops to discuss the facility with public. It is expected to save taxpayers \$377 million.

D&D&D Supported by New Technologies

DOE prepared a draft environmental assessment for the planned D&D&D of the CPP-603 basins, which have been used to store spent nuclear fuel. Unlike modern wet storage facilities, the 1950s-era concrete basins have no liners or leak detection systems. The INEEL held a public meeting to gather comments on alternatives.

As workers prepared to remove sludge from the basins, they discovered three radioactive objects. Scientists used a newly-developed underwater gamma gauge, called TUGGS, to analyze the objects in place, saving approximately \$475,000 in transportation, characterization and disposal costs.

FY 2001 Highlights

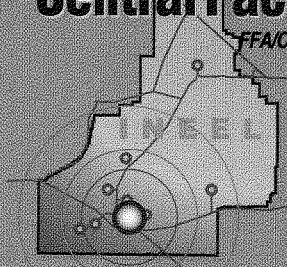
- Completed transfer of Three Mile Island-II spent nuclear fuel and core debris from TAN to a dry storage facility (Settlement Agreement)
- Received 17 Navy and 22 Advanced Test Reactor spent nuclear fuel shipments
- Treated 605,007 gallons (1,855 cubic meters) of liquid high-level waste, reducing the total volume in the tank farm to less than 1 million gallons, the lowest level since 1958 (Site Treatment Plan)
- Reduced newly-generated liquid waste by 88 percent, exceeding the goal of 50 percent
- Completed leaching of 48 HEPA filters (Site Treatment Plan)
- Installed new monitoring wells in perched water zone and continued groundwater monitoring
- Completed construction of new percolation ponds
- Initiated field activities at three sites
- Completed construction of tank farm interim actions (FFA/CO)
- Began construction of INEEL CERCLA Disposal Facility (FFA/CO)
- Completed construction of INEEL CERCLA Disposal Facility Landfill Cell 1 (FFA/CO)
- Began characterizing CPP-603 filter material (VCO)
- Moved calcine samples to permitted storage (VCO)
- Began characterizing 413 tanks or ancillary equipment (VCO)

FY 2002 Goals

- Begin D&D&D of CPP-603
- Continue processing liquid sodium-bearing waste through evaporation (Site Treatment Plan)
- Begin using new percolation ponds
- Investigate treatment alternatives for newly generated liquid waste and calcine
- Receive two containers of spent nuclear fuel from the West Valley project
- Receive 10 Navy and 14 Advanced Test Reactor spent nuclear fuel shipments
- Empty two pillar and panel tanks down to heel level (all five now emptied)
- Perform cleanup activities for Tanks WM-182 and WM-183
- Characterize 44 tanks and begin isolation and closure (VCO)

Central Facilities Area

FFA/CO Designation: Waste Area Group 4



Established: 1940s

Original Mission: Lodged U.S. Navy personnel during World War II

Current Mission: Treating and disposing of nonhazardous commercial/industrial waste; providing support services for the INEEL (medical, construction, workshops, warehouses and landfills)

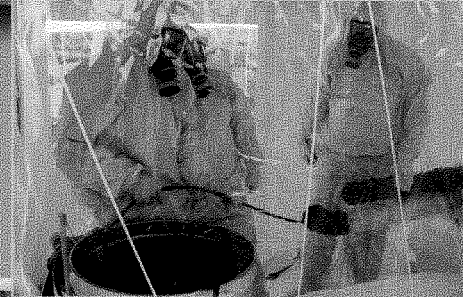
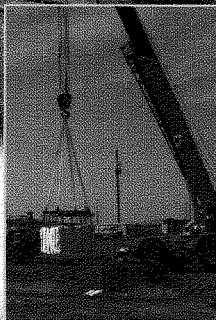
Groundwater Protected at Landfills

The Central Facilities Area landfills are used to dispose of nonhazardous commercial and industrial wastes, including nonrecyclable materials such as office wastes. Scientists have installed vertical time domain reflectometers at two closed landfills to monitor moisture in the landfill covers. The instruments allow scientists to download data directly from the field to office computers.

Remediation Almost Complete

The INEEL continued cleanup at three areas identified in the 2000 comprehensive investigation Record of Decision for the Central Facilities Area. Workers excavated lead- and cadmium-contaminated soil at the Transformer Yard, which completed one remedial action. They also removed the Hot Laundry sewer line and began designing an engineered barrier for the Sewage Treatment Plant Drainfield.

Workers remove contaminated soil at the CFA Transformer Yard



FY 2001 Highlights

- Began remediating three areas documented in 2000 Record of Decision; one area completed (FFA/CO)
- Completed characterization of all tanks (VCO)

FY 2002 Goals

- Continue remedial actions at areas documented in 2000 Record of Decision (FFA/CO)